COUNCIL COMMUNICATION

TO: THE CITY COUNCIL	COUNCIL MEETING DATE	NO.
FROM: THE CITY MANAGER'S OFFICE	JANUARY 17, 1990	

SUBJECT: SPECIFICATIONS AND ADVERTISEMENT FOR BIDS FOR THE PURCHASE OF POLEMOUNTED AND PADMOUNTED TRANSFORMERS

RECOMMENDED ACTION: That the City Council approve the specifications and authorize the advertisement for bids for 69 pole-mounted, and 19 padmounted, transformers.

BACKGROUND INFORMATION: The Electric Utility Department has requested that the following transformers be purchased to support various projects and to replenish inventory:

POLE MOUNTED:

KVA - VOLTAGE	CIRCUIT-PROTECTED	CONVENTIONAL
15 120/240	3	4
25 120/240	8	3
37.5 120/240	17	7
37.5 277	-	6
50 120/240	10	-
50 277	-	6
75 120/240	2	-
75 277	-	3
TOTAL POLE-MOUNTED:	40	29

PADMOUNTED:

KVA - VOLTAGE	SINGLE-PHASE	THREE-PHASE
37.5 240/120	5	-
50 240/120	2	-
100 240/120	6	-
112.5 208Y/120	-	2
150 480Y/277	-	1
300 208Y/120	-	3
TOTAL PADMOUNTED	13	6

Some of the projects using these transformers include the Sunwest subdivisions, the Kettleman Lane/Lower Sacramento Road development, the Industrial Substation, and budgeted distribution system improvements.

The estimated cost of this purchase is $115,000, with funding available in the Electric Utility Department's operating fund.

The bid opening has been set for Tuesday, February 13, 1990.

Joel E. Harris, Purchasing Officer

cc: Electric Utility Director
Assistant Electric Utility Director
Electrical Engineer

SPECIFICATIONS Rev. 10/23/89

POLE-MOUNTED TRANSFORMERS - OIL FILLED

DIVISION 1

1-1 GENERAL:

Electrical design and materials shall conform to the latest EEI-NEMA and ANSI Standards. It is the intent of these specifications to describe equipment of the best design and construction, for the service for which it is intended. Consequently, it shall be the City's desire to award contracts to the bidder who has demonstrated high quality, by having a considerable number of transformers of his manufacture in service on the lines of electrical utilities over a period of years.

1-2 PERFORMANCE SPECIFICATIONS:

Bidders shall submit with their bid complete performance specifications of the transformers they propose to furnish. Failure to supply transformer data may be cause for rejection of the bid.

1-3 TESTS:

Transformers shall receive at least the following tests in accordance with the applicable ANSI and NEMA Standards:

(1) Load & no load loss.
(2) Exciting current.
(3) Polarity check.
(4) Ratio Check.
(5) Applied and induced potential test.
(6) Impulse voltage test.
(7) Tank pressure.

1-4 SERVICE:

The manufacturer shall own and operate a service shop in this vicinity, or the bidder may submit evidence that he has a repair contract with an approved service shop in this vicinity, which has been in effect for a period of at least one year. (For the purpose of this specification: Vicinity shall mean within a 200-mile radius of the City of Lodi).

1-5 GUARANTEE:

The contractor shall guarantee all equipment delivered under these specifications against any and all defects in material and/or workmanship for a period of at least one year from date of acceptance. He shall rectify all such defects by repair or replacement at his own expense and assume responsibility for associated shipping costs.

POLE-MOUNTED TRANSFORMERS - OIL FILLED

1-6 TECHNICAL INFORMATION:

The following specifications shall be met:

(1) Insulation level: 95 kv BIL (min.).

(2) Insulation rating: 65 degree C rise.

(3) All exterior surfaces shall be coated, using a system of coordinated and thoroughly tested materials end application techniques that will assure long life. Special attention shall be given to welds, seams, edges and rough spots.

(4) Lifting lugs shall be provided on the tank and shall be lccated in such a way to avoid interference between lifting slings and any attachments on the transformer and to avoid scratching the transformer coating.

(5) Tanks shall be tested at a pressure equal to or greater than the maximum operating pressure and for a sufficient period of time to insure that all welds are free from leaks. Tank construction shall be consistent with good manufacturing and design practices prevalent in the transformer industry, and together they should contribute to a high quality product.

(6) Stainless steel nameplate shall be securely attached to the transformer by means of stainless steel screws, rivets or other fasteners. The letters and numbers shall be stamped on the nameplate. The nameplate shall include the words, "Fluid is less than one p.p.m. PCB," refer to Sec. 1-8 below. The instruction nameplate shall contain the information specified in Section 5.12 of ANSI Standard C57.12.00 - 1980.

(7) Sound level: The sound level shall be equal to or better than EEI-NEMA Standards.

(8) Transformer radiators (fins) shall not interfere with installation or G.O. 95 requirements when banked together.

1-7 LOSSES:

Losses will be considered in the evaluation of this bid as follows:

No-load (core) loss @ $6.00/watt.
Load (winding) loss @ $2.00/watt.

The cost-of-losses will be added to the equipment price (bid price) F.O.B. Lodi, including maximum escalation, to determine the evaluated low bid of vendor otherwise meeting these specifications. All bidders shall supply the following guaranteed loss data for use in the evaluation, in addition to other data listed, in the specifications:

1. No-load losses in watts at rated secondary voltage.

2. Load losses in watts at rated secondary voltage and rated load (65 degrees C).

3. Upon request, furnish certification/statement of the guaranteed loss measurement error of the test equipment and measurement method to be used, including the basis 9or determination of the accuracy of the test equipment and measurement method.

The successful bidder shall supply a certified test report of actual losses of the unit(s) to be supplied. The no-load and load losses +or each group (type and size) of transformer(s) wi11 be averaged separately within their respective catagories (no-load and load losses). If the averaged tested no-load (core) and/or load (winding) losses of the transformer group exceed the watt losses quoted in the porposal, the contract price shall be reduced by the above amounts per watt of actual group averaged no-load and/or actual load loss in excess of that quoted in the proposal. No-load loss penalties wi1l be evaluated separately from load loss penalties. No additional payment will be made to the manufacturer or bidder for actual losses lower than the losses Quoted in the porposal. The loss test data to be used in the penalty evaluation shall be at rated voltage (no-load) 65 degrees C.

Certified test report of losses shall be submitted by the manufacturer prior to or at the time of shipment of the transformer.

1-8 PCB CONTENT:

Transformer fluid shall be guaranteed to contain less than one p.p.m. by weight (mg/kg) Pclychlorinated Biphenyls (PCB). Certified test report of PCB content shall be produced upon request. The transformer nameplate to include the words, "Fluid is less than one p.p.m. PCB."

DIVISION 2

POLE-MOUNTED TRANSFORMERS - SINGLE-PHASE

2-1 GENERAL:

In addition to that specified in Division 1 Requirements, transformers shall be provided with the following:

(1) High Voltage Bushings:

A. Quantity: Two

B. Bushing terminals to be clamp-type suitable for use with copper and aluminum conductor.

(2) Low Voltage Bushings:

A. Quantity:

277-Volt: Two

All Others: Three

B. Shall be tank wall-mounted.

C. Bushing terminals:

100 KVA and lower: Shall be clamp-type suitable for use with copper and aluminum conductor.

Over 100 KVA: Shall be NEMA-4 pads (4-hole).

(3) Pressure relief valve: Qualitrol 202-030-01, or an approved equal.

(4) Lifting lugs shall be welded to the tank.

(5) Provide tank grounding pad and a visible tank-to-cover ground strap.

(6) Hanger brackets, welded to the tank.

(7) Hanger brackets shall permit bolting of transdormer directly to pole.

(8) Single phase, 60 Hz, OISC.

2-2 RATINGS 9ND DESIGN:

Transformers shall have the following ratings and design:

(1) Distribution type, pole-bolted transformers.

(2) 12,000-volt Gelta primary,

(3) Single phase.

(4) Without arresters and taps.

(5) CP or conventional type as specified on proposal form. CP transformers to have one weaklink (fuse) per primary bushing and a breaker on the secondary side.

(6) Secondary voltage to be a5 specified on proposal form.

(7) KVA rating to be as specified on proposal form.

SPECIFICATIONS
PADMOUNTED TRANSFORMERS

Rev. 10/23/89

DIVISION 1

1-1 GENERAL:

Electrical design and materials shall conform to the latest EEI-NEMA and RNSI Standsrds for Oil-Filled Equipment. It is the intent of these specifications to describe equipment of the best design and construction, for the service for which it is intended. Consequently, it shall be the City's desire to award contracts to the bidder who has demonstrated high quality, by having a considerable number of transformers of his manufacture in service on the lines of electrical utilities over a period of years.

1-2 PERFORMANCE SPECIFICRTIONS:

Bidders shall submit with their bid complete performance specifications and dimensions of the transformers they propose to furnish. Failure to supply transformer data may be cause for rejection of the bid.

1-3 TESTS:

Transformers shall receive at least the following tests in accordance with the applicable ANSI and NEMA Standardsr

(1) Load & no load loss.
(2) Exciting current.
(3) Polarity check.
(4) Ratio check.
(5) Applied and induced potential test.
(6) Impulse voltage test.
(7) Tank pressure.

1-4 SERVICE:

The manufacturer shall own ano operate a service shop in this vicinity, or the bidder may submit evidence that the manufacturer has a repair contract with an approved service shop in this vicinity, which has been in effect for a period of at least one year. (For the purpose of this specification: Vicinity shall mean within a 200 mile radius cf the City of Lodi .)

1-5 GUARANTEE:

The manufacturer shall guarantee all equipment delivered under these specifications against any and all defects in material and/or workmanship for a period of at least one year from date of acceptance. The manufacturer shall rectify all such defects by repair or replacement at his own expense and assume responsibility for associated shipping costs.

DIVISION 1

1-6 TECHNICAL INFORMATION:

The following specifications shall be met:

(1) Insulation level: 95 kv BIL (min.).

(2) Insulation rating: 65 degree C rise.

(3) Two ground lugs which accept 4-1/0 AWG copper shall be provided.

(4) All exterior surfaces shall be coated, using a system of coordinated and thoroughly tested materials and application techniques that will assure long life. Special attention shall be given to welds, seams, edges and rough spots.

(5) Lifting lugs shall be provided on the tank and shall be located in such a way to avoid interference between lifting slings and any attachments on the transformer and to avoid scratching the transformer coating.

(6) Tanks shall be tested at a pressure equal to or greater than the maximum operating pressure and for a sufficient period of time to insure that all welds are free from leaks. Tank and radiator construction shall be consistent with good manufacturing and design practices prevalent in the transformer industry, and together they should contribute to a high quality product.

(7) Stainless Steel nameplate shall be securely attached to the transformer by means of stainless steel screws, rivets or other fasteners. The letters and numbers shall be stamped on the nameplate. The nameplate shall include the words, "Fluid is less than one p.p.m. PCB". Refer to Section 1-8. The instruction nameplate shall contain the information specified in Section 5.12 of ANSI Standard C57.12.00 -1980.

(8) The sound level shall be equal to or better than EEI-NEMA Standards.

DIVISION 1

1-7 LOSSES:

Losses will be considered in the evaluation of this bid as follows:

No-load loss (core) @ $6.00/watt.

Load loss (winding) @ $2.00/watt.

The cost-of-losses will be added to the equipment price (bid price) F.O.B. Lodi, including maximum escalation, to determine the evaluated low bid of vendor otherwise meeting these specifications. All bidders shall supply the following guaranteed loss data for use in the evaluation, in addition to other data listed in the specifications.

(1). No-load losses in Watts at rated secondary voltage.

(2). Load losses in Watts at rated secondary voltage and rated load (65 degrees C).

(3). Upon request, furnish certification/statement of the guaranteed loss measurement error of the test equipment and measurement method to be used, including the basis for determination of the accuracy of the test equipment and measurement method.

The successful bidder shall supply a certified test report of actual losses of the unit(s) to be supplied. The no-load and load losses for each group (type and size) of transformer(s) will be averaged separately within their respective catagories (no-load and load losses). If the averaged tested no-load (core) and/or load (winding) losses of the transformer group exceed the Watt losses quoted in the proposal, the contract price shall be reduced by the above amounts per Watt of actual group averaged no-load and/or actual load loss in excess of that quoted in the proposal. No-load loss penalties will be evaluated separately from load loss penalties. No additional payment will be made to the manufacturer or bidder for actual losses lower than the losses quoted in the proposal. The loss test data to be used in the penalty evaluation shall be at rated voltage (no-load), 65 degrees C.

Certified test report of losses shall be submitted by the manufacturer prior to or at the time of shipment of the transformer.

1-8 PCB CONTENT:

Transformer fluid shall be guaranteed to contain less than one p.p.m. by weight (mg/Kg) Polychlorinated Biphenyls (PCB). Certified test report of PCB content shall be produced upon request. The transformer nameplate to include the words, "Fluid is less than one p.p.m. PCB."

1-9 DIMENSIONS:

The overall dimensions (height, width, depth, - height only for single-phase units) of the units will be considered in the evaluation of this bid. Please submit alternate bids for low profile units meeting these specifications.

1-10 LABELING:

The units are to be shipped without the Safety Labels per NEMA No. 260-1982. The City will affix its personalized "Mr. Ouch" labels.

1-11 PADMOUNTED EQUIPMENT ENCLOSURES:

(1) General

A. A typical padmounted equipment enclosure consists of a surrounding case or housing for equipment to prevent unauthorized access to protect people against accidental contact of energized parts and protect equipment against weather hazards. The enclosure is mounted on a pad, above ground level, and may be ventilated to permit circulation of air.

B. Entry into the enclosure shall be through either an access door(s) or hood(s) as specified.

(2) Structural Strength and Integrity Test:

The structural strength and integrity test shall comply with the latest NEMA Official Standards and ANSI Standards for testing, design and enclosure security.

DIVISION 1

1-11 (Continued)

(3) Construction

A. The construction shall be such that:

1. It prevents the entry of foreign objects, such as sticks, rods, or wires.

2. It inhibits dismantling of the equipment.

3. It is free of areas which could provide access by forcing techniques.

4. Panels shall be fastened or hinged to resist disassembly, breaking or prying open from the outside. Normal entry shall be possible only with the use of proper access tools. Latches and other provisions for locking hinged panels shall be furnished.

5. There shall be no exposed screws, bolts, or other fastening or hinging devices which are externally removable (with the exception of pentahead bolts provided for extra security) that would provide access to energized parts of the enclosure.

B. The transformer tank and enclosure shall be constructed of minimum 14 gauge steel. The radiator to be constructed of minimum 18 gauge steel.

C. In addition to the regular locking provisions, all access doors shall be secured by a recessed, captive, pentahead bolt which threads into a nut with a blind hole. A pentahead bolt shall be considered **captive"when the retention scheme will prevent it from being readily removed during normal operation of the door(s) of the hood(s). The recess is to be nonrotating. The dimensions of the pentahead bolt and nonrotating recess shall comply with Figure 11 of the ANSI C57.12.26-1975. If all doors can be secured with a single bolt, one bolt will be sufficient.

DIVISION 1

1-11 (Continued)

D. Each latched door(s) shall be latched at a minimum of three points. In addition to the three-point latching, one pentahead bolt shall be coordinated with the latch and padlock to prevent unlatching and insertion of the padlock into the hasp when and until the bolt head is essentially completely seated, respectively. Low profile cabinets, with access flip-up hoods, need only padlock and pentahead bolt provisions, and shall be coordinated to prevent insertion of the padlock into the hasp until the bolt head is essentially completely seated.

E. The padlocking device shall be so designed and located as to resist prying or breaking off by screwdrivers, wrecking bars, tire irons, single-socket lug wrenches, or other readily accessible tools.

F. The edges of the access doors or hoods shall be formed to provide:

1. A close-fitting mating surface, with internal insertion-prevention lip that will be shaped to prohibit entry or prying by screwdrivers, wrecking bars, tire irons, single-socket lug wrenches, or other readily accessible tools.

2. A rigid panel which, in conjunction with a handle-linkage-latching mechanism with three (or more) point latching, will resist bending in the event that sufficient force is applied to distort the compartment or compartment door(s) and permit prying access to the door edges.

6. Hinge pins shall be passivated AISI (American Institute of Steel Industries) Type 304 stainless steel or equivalent corrosion-resistant metal.

H. If a handhole cover is exposed, it shall be secured against tampering by some means accessible only from the inside of the compartment.

1. The bottom edge of the enclosure shall provide for flush mounting on a flat, rigid mounting surface to prevent wire entry into the compartment.

DIVISION 2 - SINGLE PHASE

2-1 GENERAL:

Transformer enclosures to be in conformance with Division 1 of this specification and be of the low-profile design, maximum height for 75 KVA and below shall be 28", and for 100 KVA and above shall be 33". The access door shall open to the top 180 degree and be removable. The design shall be dead front, loop feed. Cables shall enter and leave the transformer from below through openings in a pad. The front plate of the transformer tank shall be constructed (reinforced) in such a manner that tank pressure does not cause any reduction in clearances between the energized parts and grounded surfaces, i.e. deflection resulting in spades and bushings moving toward the sides of the door.

The Bay-O-Net fuse shall be positioned in such a way that the fuse assembly can be inserted and locked in any position without interfering with the closed door. Fastening of the oil drip plate and/or the fuse insertion restrictive device with a "U" clamp around the molded outer tube assembly is not acceptable.

2-2 BUSHING HEIGHTS:

Primary and secondary bushing heights shall comply with the latest revisions of NEMA TR1 and ANSI CS7.12.25-1981 standards Type 2 Arrangement Figure 2(b).

2-3 STANDARD ACCESSORIES:

In addition to that specified in Division 1, transformers shall be provided with the following:

(1) Pressure relief valve, Qualitrol 202-030-01, or approved equal.

(2) Low voltage terminals, 4-hole in-line spade type (all insulated), which may be rotated to allow convenient connection of cables.

(3) Oil level and drain plugs.

(4) Two (2) parking stands for high-voltage terminations.

(5) Two (2) loop feed, high-voltage universal bushing wells.

(6) Bay-O-Net fuse assembly with molded outer tube, RTE Catalog #4000361C99M, or approved equal; isolation link, RTE Catalog #3001861A07, or approved equal; and oil drip plate below fuse holder entrance. Fuse element not to bt installed, but supplied in a bag attached to fuse holder handle.

2-4 RATINGS AND DESIGN:

(1) Dead front, loop feed with two (2) universal bushing wells.

(2) Voltage: 12,000 Grd.Wye/6930 Volts primary to 240/120 Volts secondary.

(3) Single phase, 60 Hz, OISC.

(4) Transformers shall be provided with RTE Bay-O-Net load sensing #4000358C or approved equal fuse links in accordance with Table I.

(5) KVA rating to be as specified on proposal form.

DIVISION 2

TABLE I

FUSE LINKS

Single Phase		
Transformer KVA	Link	
	Designation	Rating (Amp)
10	C5	8
15	C5	8
25	C5	8
37.5	C8	15
50	C8	15
75	C10	25
100	C10	25
167	C12	50

DIVISION 3 - THREE PHASE

3-1 GENERAL

Enclosure to be in conformance with Division 1 of this Specification. Maximum transformer height shall not exceed values listed in Table A below:

TABLE A

TRANSFORMER KVA	MAXIMUM HEIGHT
300 KVA AND BELOW	65"
500 KVA	75"
750 AND ABOVE	90"

High and low voltage sections shall be separated and the low voltage door shall be equipped with a locking handle, and in addition, the doors so arranged that access to the high-voltage compartment can be gained only after opening the low-voltage door; doors shall be removable. Cables shall enter and leave the cumpartment sections from below, through openings in a concrete pad.

Fastening of the oil drip plate and/or the fuse insertion restrictive device with a "U" clamp around the molded outer tube assembly is not acceptable.

3-2 BUSHING HEIGHTS:

Primary and secondary bushing locations and heights shall comply with the latest revisions of NEMA TR1 and ANSI C57.12.26-1975 standards for Type A primary and staggered low-voltage terminal arrangement.

DIVISION 3

3-3 STANDARD ACCESSORIES:

In addition to that specified in Division 1, transformers shall be provided with the following:

(1) Pressure relief valve: Qualitrol 202-030-01, or approved equal.

(2) Four low voltage bushing spades f4-hole NEMA (square) on 300 KVCI and below; 6-hole (or more) NEMA (square) on 500 KVA and above3.

(3) Liquid level gauge, drain valve with sample valve and oil filler plug. Drain valve to be located in the high-voltage compartment.

(4) Parking stands for each high-voltage elbow terminator.

(5) Universal bushing wells, for high-voltage terminations.

(6) Bay-O-Net fuse assemblies with molded outer tube, RTE Catalog #4000361C99M, or approved equal; isolation link, RTE Catalog #3001861A07, or approved equal; and oil drip plate below fuse holder entrance. Fuse elements not to be installed, but to be supplied in a bag attached to fuse holder handle.

3-4 RATINGS AND DESIGN:

(1) Dead front, radial feed design with three (3) universal bushing wells.

(2) 12,000-volt Delta-connected primary.

(3) Three phase, 60 hz, OISC.

(4) *500* KVA and Larger Units Only:

ON-OFF loadbreak, gang-operated, oil-immersed switch.

Switch handle with eye for operation with hot stick shall be located in high-voltage compartment.

DIVISION 3

3-4 (Continued)

(5) Transformers shall be provided with RTE Bay-O-Net load sensing #4000358C or fault sensing #4000353C or approved equal fuse links in accordance with Table If.

(6) Secondary voltage rating to be as specified on proposal form.

(7) KVA ratings to he as specified on proposal form.

DIVISION 3

TABLE II

FUSE LINKS

Transformer KVA	12,000—V Delta Link	
	Designation	Rating (Amp)
45	C5	8
75	C5	8
112.5	C8	15
150	C8	15
225	C10	25
300	C10	25
500	C12	50
Fault Sensing		
750	C14	65
1000	C16	100
1500	C17	140